E

TG/14/10(proj.3)
ORIGINAL: English
DATE: 2020-05-29

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

APPLE*

UPOV Code(s): MALUS_DOM

Malus domestica Borkh.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Germany
to be considered by the
Technical Working Party for Fruit Crops
at its fifty-first session, to be held in Nîmes, France,
from 2020-07-06 to 2020-07-10

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Malus domestica Borkh., *Malus pumila* Mill var. *domestica*, *Pyrus malus* L.	Apple	Pommier, Pommier commun	Apfel, Kultur-Apfel	Manzano

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

Other associated UPOV documents: TG/163/4 Apple Rootstocks
TG/192/1 Ornamental Apple

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Malus domestica* Borkh. except for varieties used only as rootstock varieties (see TG/163/3) or only as ornamental varieties (see TG/192/1).

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of trees, on a rootstock specified by the competent authority, or in the form of budsticks or graftwood.

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

(a) varieties resulting from crossing:
5 trees; 5 budsticks; or 5 dormant shoots for grafting;
(b) varieties resulting from mutation:
10 trees; 10 budsticks; or 10 dormant shoots for grafting.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 Number of Growing Cycles

3.1.1 The minimum duration of tests should normally be two independent growing cycles.

3.1.2 The two independent growing cycles may be observed from a single planting, examined in two separate growing cycles.

3.1.3 In particular, it is essential that the trees produce a satisfactory crop of fruit in each of the two growing cycles.

3.1.4 The growing cycle is considered to be the duration of a single growing season, beginning with bud burst (flowering and/or vegetative), flowering and fruit harvest and concluding when the following dormant period ends with the swelling of new season buds.

3.1.5 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

3.2 Testing Place

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

3.3 Conditions for Conducting the Examination

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The optimum stage of development for the assessment of each characteristic is indicated by a number in the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

3.4 Test Design

3.4.1 In the case of varieties resulting from crossing, each test should be designed to result in a total of at least 5 trees.

3.4.2 In the case of varieties resulting from mutation, each test should be designed to result in a total of at least 10 trees.

3.4.3 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.5 Additional Tests

Additional tests, for examining relevant characteristics, may be established.

4. Assessment of Distinctness, Uniformity and Stability

4.1 Distinctness

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.1.4 Number of Plants or Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 3 plants or parts of plants taken from each of 3 plants and any other observations made on all plants in the test, disregarding any off-type plants.

4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

4.2 Uniformity

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 These Test Guidelines have been developed for the examination of vegetatively propagated varieties. For varieties with other types of propagation, the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

4.2.3 For the assessment of uniformity of varieties resulting from crossing, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 5 plants, no off-types are allowed.

4.2.4 For the assessment of uniformity of varieties resulting from mutation, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 10 plants, 1 off-type is allowed.

4.3 Stability

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Tree: type (characteristic 2)
(b) Only varieties with Tree type: ramified: Tree: habit (characteristic 3)
(c) Fruit: shape (characteristic 26)
(d) Fruit: hue of over color (characteristic 30)
(e) Fruit: relative area of over color (characteristic 32)
(f) Fruit: pattern of over color (characteristic 33)
(g) Fruit: color of flesh (characteristic 45)
(h) Time of beginning of flowering (characteristic 47)
(i) Time of eating maturity (characteristic 49)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 “Examining Distinctness”.

6. Introduction to the Table of Characteristics

6.1 Categories of Characteristics

6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

State	*Note*
small	3
medium	5
large	7

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

State	*Note*
very small	1
very small to small	2
small	3
small to medium	4
medium	5
medium to large	6
large	7
large to very large	8
very large	9

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

6.4 Example Varieties

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

6.5 Legend

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1 2	**3 4**	**5 6**	**7**			
	Name of characteristics in English	**Nom du caractère en français**	**Name des Merkmals auf Deutsch**	**Nombre del carácter en español**		
	states of expression	types d’expression	Ausprägungsstufen	tipos de expresión		

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

5 (+) See Explanations on the Table of Characteristics in Chapter 8.2

6 (a)-(f) See Explanations on the Table of Characteristics in Chapter 8.1

7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8

7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QN**	**VG**	**(+)**	**(a)**	**00**			
		Tree: vigor							
		very weak						Grenadier, Nield's Drooper	1
		very weak to weak						James Grieve, Redkan	2
		weak						Alkmene, Regine	3
		weak to medium						Piros, Pomforyou, Renora	4
		medium						Gala, Pinova, Trajan	5
		medium to strong						Dalili, Pia, Pivita	6
		strong						Elstar, Rafzubin, Santana	7
		strong to very strong						Bay 3484, Collina, Cripps Pink	8
		very strong						Gloster, Ingrid Marie	9
2.	**(*)**	**QL**	**VG**		**(a)**	**00**			
		Tree: type							
		columnar						MacExcel, Wijcik	1
		ramified						Elstar, Golden Delicious	2
3.	**(*)**	**PQ**	**VG**	**(+)**	**(a)**	**00**			
		Only varieties with Tree type: ramified: Tree: habit							
		upright						Alkmene, Fresco, Solaris	1
		upright to spreading						Akane, Arkcharm, Harmensz, Katrina, Reka	2
		spreading						Pinova, Redkan, Topaz	3
		drooping						Idared, James Grieve, Pivita	4
		weeping						Gerlinde, Nield's Drooper	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
4.	**(*)**	**QN MG/VG**	**(+) (b)**	**00**			
		One-year-old shoot: length of internode					
		very short				MacExcel, Wijcik	1
		very short to short				Alkmene, Coxcolumnar, Tuscan	2
		short				Florina	3
		short to medium				Ahrista, Margol	4
		medium				Jonagold, Redaphough	5
		medium to long				Constance, Crowngold, Nicoter, Stela	6
		long				Auralia	7
		long to very long				Angold	8
		very long				Teser	9
5.	**(*)**	**QN MG/VG**	**(+) (b)**	**75/77**			
		One-year-old shoot: number of lenticels					
		few				Alkmene, Bramley's Seedling	1
		medium				Cox's Orange Pippin	2
		many				Mutsu, SQ 159	3
6.	**(*)**	**QN VG**	**(+) (c)**	**75/77**			
		Leaf blade: attitude in relation to shoot					
		upwards				Delblush, Elstar, Fresco, Redkan, Santana	1
		upwards to outwards				Jugala, Prem A 153, Resista, Sweet Lady	2
		outwards				Cripps Pink, Jonagold, Pinova, Pomforyou, Schone van Boskoop	3
		downwards				Fuji BC, Himekami, Rewena	4

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**(*)**	**QN**	**MG/VG**	**(+)**	**(c)**	**75/77**			
		Leaf blade: length							
		very short						Mars, Reanda	1
		very short to short						Coxcolumnar, Goldstar	2
		short						Ariwa, Gusto	3
		short to medium						Braeburn, Fuji BC, Topaz	4
		medium						Cripps Red, Dalili, Elstar	5
		medium to long						Jonagold, Pinova, Santana	6
		long						Fresco, Minnewashta, Monidel	7
		long to very long						Pomforyou, Pompink	8
		very long						Northpole, Telamon	9
8.	**(*)**	**QN**	**MG/VG**	**(+)**	**(c)**	**75/77**			
		Leaf blade: width							
		very narrow						Coxdwarf	1
		very narrow to narrow						Cox La Vera, Dalinco	2
		narrow						Braeburn, La Flamboyante	3
		narrow to medium						Dalili, Dalinbel, Elstar, Topaz	4
		medium						Cripps Red, Nicoter, Pinova, Santana	5
		medium to broad						Cripps Pink, Jonagold, Rubinola, Zari	6
		broad						Jonagored, Rubinstep	7
		broad to very broad						Pomforyou	8
		very broad						Charlotte, Northpole	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
9.	**(*)**	**QN MG/VG**	**(+) (c)**	**75/77**			
		Leaf blade: ratio length/width					
		very low					1
		very low to low				Reanda	2
		low				Goldstar	3
		low to medium				Bay 3484, Rubinola	4
		medium				Cripps Pink, Rafzubin, Santana	5
		medium to high				Braeburn, Cripps Red, Elstar, Pinova	6
		high				Fiesta, Minnewashta	7
		high to very high				Civni, Monidel	8
		very high				Dalinco, Telamon	9
10.		**QN VG**	**(c)**	**75/77**			
		Leaf blade: intensity of green color					
		light					1
		light to medium				Maribelle	2
		medium				Civni, Cripps Pink, Ecolette	3
		medium to dark				Braeburn, Karmijn de Sonnaville, La Flamboyante, Pomforyou	4
		dark				Luresweet	5
11.		**QN VG**	**(c)**	**75/77**			
		Leaf blade: glossiness					
		absent or weak				Blahova Libovice, Solaris	1
		medium				Elstar, Falstaff	2
		strong				Elise, Fresco, Idared	3
12.	**(*)**	**QN VG**	**(+) (c)**	**75/77**			
		Leaf blade: incisions of margin					
		crenate				Braeburn, Pinova, Santana	1
		crenate to serrate				Ecolette, Elstar, Tenroy	2
		serrate					3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13.		**PQ VG**	**(+) (c)**	**65**			
		Leaf blade: shape in cross section					
		v-shaped				Frureru	1
		concave				Alkmene, Clivia, Gloster, Piros	2
		flat with raised margins				Rambour d'Hiver	3
		flat				Bittenfelder Sämling, Minnewashta	4
		convex				Collina, Vicking	5
14.	**(*)**	**QN MG/MS/VG**	**(+) (c)**	**65**			
		Petiole: length					
		very short					1
		very short to short				Jonagold	2
		short				Delgollune, Jonagored	3
		short to medium				Bay 3484, Dalinbel	4
		medium				Cripps Pink, Ecolette, Nicoter, Pinova, Topaz	5
		medium to long				Civni, Cripps Red, Elstar	6
		long				Resista	7
		high to very long				Pomforyou, Trajan	8
		very long				Northpole, Pompink	9
15.		**QN MG/VG**	**(+)**				
		Leaf: ratio length of leaf blade / length of petiole					
		very low					1
		low					2
		medium					3
		high					4
		very high					5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
16.	**QN VG**	**(c)**	**74**			
	Petiole: extension of anthocyanin coloration from base					
	very small				Befresh	1
	small				Civni, Cripps Red, Jonagold	2
	medium				Braeburn, Dalinbel, Pilot	3
	large				Pomforyou, Scired	4
	very large				Bay 3484	5
17. **(*)**	**QN MG/VG**	**(+)** **(d)**	**87**			
	Flower: diameter					
	very small				Spätblühender Taffetapfel	1
	small				Pia, Pingo	2
	medium				Civni, Elstar, Pinova	3
	large				Delcorf, Rafzubin, Zari	4
	very large				Astramel	5
18.	**QN VG**	**(+)** **(d)**	**87**			
	Flower: position of stigmas relative to anthers					
	below				Bay 3484, Braeburn, Pomforyou, Topaz	1
	same level				Cripps Pink, Ecolette, Pinova, Santana	2
	above				Civni, Elstar, Nicoter, Rafzubin	3
19.	**QN VG**	**(+)** **(d)**	**87**			
	Flower: intensity of anthocyanin coloration at base of filament					
	absent or light				Golden Noble	1
	medium				Elshof	2
	dark				Lurefresh	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
20.	**(*)**	**QN**	**VG**	**(+)**	**(d)**	**87**			
		Flower: arrangement of petals							
		free						Braeburn, Nicoter, Scifresh	1
		intermediate						Civni, Elstar, Pinova, Topaz	2
		overlapping						Cripps Red, Pomforyou, Šampion	3
21.		**QN**	**VG**		**(e)**	**87**			
		Young fruit: extent of anthocyanin over color							
		absent or very small						Norhey	1
		very small to small						Nicogreen	2
		small						Cripps Pink, Delcorf, Nicoter	3
		small to medium						Braeburn, Tenroy, Topaz	4
		medium						Elstar, Golden Delicious	5
		medium to large						Pinova, Solaris	6
		large						Delblush, Rafzubin	7
		large to very large						Jolana	8
		very large						Bay 3484, Luregust	9
22.	**(*)**	**QN**	**MG/VG**	**(+)**	**(f)**	**87**			
		Fruit: size							
		very small						Api Noir	1
		very small to small						Norhey	2
		small						Heco, Trajan	3
		small to medium						Bay 3484, Pomforyou	4
		medium						Cripps Pink, Elstar, Pinova, Topaz	5
		large						Golden Delicious, Santana	6
		medium to large						Jonagold, Nicoter	7
		large to very large						Nicogreen	8
		very large						Howgate Wonder, Pisaxa	9

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
23.	**(*)**	**QN**	**MG/VG**	**(+)**	**(f)**	**87**			
		Fruit: height							
		very short						Norhey	1
		very short to short						Heco	2
		short						Trajan	3
		short to medium						Elstar, Pomforyou, Topaz	4
		medium						Bay 3484, La Flamboyante, Santana	5
		medium to tall						Cripps Pink, Pinova, Šampion	6
		tall						Golden Delicious, Jonagold	7
		tall to very tall						Pisaxa	8
		very tall						Befresh	9
24.	**(*)**	**QN**	**MG/VG**	**(+)**	**(f)**	**87**			
		Fruit: diameter							
		very small						Nela, Scarlet Surprise, Summerred	1
		very small to small						Heco	2
		small							3
		small to medium						Cox's Orange Pippin, Cripps Pink, Dalili, Pomforyou	4
		medium						Elstar, Pinova, Topaz	5
		medium to large						Braeburn, Nicoter	6
		large						Dalinbel, Jonagold	7
		large to very large						Befresh, Ontario	8
		very large						Bramley's Seedling	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
25.	**(*)**	**QN MG/VG**	**(+) (f)**	**87**			
		Fruit: ratio height/diameter					
		very low					1
		very low to low				Brettacher, Ingol	2
		low				Auralia, Harmensz	3
		low to medium				Dalinbel, Elstar, Karmijn de Sonnaville	4
		medium				Ecolette, Fuji BC, Pomforyou, Santana	5
		medium to high				Civni, Jonagold, Rafzubin	6
		high				Braeburn, Golden Delicious, Pinova	7
		high to very high				Cripps Pink, Dalili	8
		very high				Rewena, Saturn	9
26.	**(*)**	**PQ VG**	**(+) (f)**	**87**			
		Fruit: shape					
		conical waisted				Gloster, Redkan	1
		conical				Civni, Elstar, Nicoter, Pinova, Rafzubin	2
		globose conical				Bay 3484, Braeburn, Scifresh	3
		flat globose conical				Melrose	4
		ovate				Cripps Pink, Delcorf	5
		square				Bonita	6
		oblong				Čadel , Renora	7
		elliptic				Fuji BC, Minnewashta	8
		circular				Dalinbel, Rubinola, Topaz	9
		oblate				Bramley’s Seedling, Lipno	10
		obconical				Empire	11

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27.		**QN VG**	**(f)**	**87**			
		Fruit: ribbing					
		absent or weak				Elstar, Harmensz, Pinova, Scifresh, SQ 159	1
		moderate				Cripps Pink, Dalili, Pilot, Santana	2
		strong				Redkan	3
28.		**QN VG**	**(f)**	**87**			
		Fruit: crowning at calyx end					
		absent or weak				Elstar, Fresco, Heco, Schone van Boskoop	1
		medium				Luregust, Pinova, Santana, Scifresh, Topaz	2
		strong				Redkan	3
29.	**(*)**	**PQ VG**	**(f)**	**87**			
		Fruit: ground color					
		not visible				Bay 3484, Lurefresh, Luregust, Red Jonaprince	1
		whitish yellow				Heco	2
		yellow				Rea Gold, Scifresh, Solaris	3
		whitish green				Fuji BC, MC 38, Pomforyou, Pompink	4
		yellow green				Jonagold, Pia, Suntan	5
		green				Canada gris, Granny Smith, Ontario, Tuscan	6
30.	**(*)**	**PQ VG**	**(+) (f)**	**87**			
		Fruit: hue of over color					
		orange red				Goldstar, Rea Gold, Solaris	1
		pink red				Cripps Pink, Delorgue	2
		red				Pinova, Prima, Red Elstar, Tenroy	3
		purple red				Bay 3484, Luresweet, MC 38, Spartan	4
		brown red				Braeburn, Fiesta, Fresco, Fuji BC, Suntan	5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
31.	**(*)**	**QN VG**	**(+) (f)**	**87**			
		Fruit: intensity of over color					
		very light				Alexis	1
		very light to light				Golden Delicious, Solaris	2
		light				Tenroy, Tuscan	3
		light to medium				Elstar, Monidel, Rafzubin	4
		medium				Cripps Pink, Pia, Pilot, Remo	5
		medium to dark				Fiesta, James Grieve, Jonagold, Suntan	6
		dark				Elise, Jonagored, Lurefresh, Scired	7
		dark to very dark				Bay 3484, Obelisk, Red Jonaprince, Redkan	8
		very dark				B 8 A 3-323, CIVG 198	9
32.	**(*)**	**QN VG**	**(f)**	**87**			
		Fruit: relative area of over color					
		absent or very small				Granny Smith, Tuscan	1
		very small to small				Golden Delicious	2
		small				Auralia, Cox's Orange Pippin, Goldstar, Solaris	3
		small to medium				Charlotte, Schone van Boskoop	4
		medium				Dalili, Elstar, Minnewashta, Rea Gold	5
		medium to large				Heco, Pia, Rafzubin	6
		large				Fiesta, Santana, Suntan, Tenroy	7
		large to very large				Mars, Rosy Glow, SQ 159	8
		very large				Bay 3484, MC 38, Red Jonaprince, Redkan	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33.	**(*)**	**PQ VG**	**(f)**	**87**			
		Fruit: pattern of over color					
		only solid flush				Bay 3484, Red Jonaprince, Telamon	1
		solid flush with weakly defined stripes				Bruggers Festivale, Charlotte, Cripps Pink, Pingo	2
		solid flush with strongly defined stripes				Dalili, Pia, Pompink	3
		weakly defined flush with strongly defined stripes				James Grieve Esselborn, Rekarda	4
		only stripes (no flush)				Dülmener Rosenapfel	5
		flushed and mottled				Dalinbel, Scifresh	6
		flushed, striped and mottled				Elstar, Pinova, Rafzubin, Topaz	7
		marbled				Karneval	8
34.		**QN MG/VG**		**87**			
		Fruit: conspicuousness of stripes					
		weak					1
		medium					2
		strong					3
35.	**(*)**	**QN VG**	**(f)**	**87**			
		Fruit: area of russet around stalk attachment					
		absent or small				Dalili, Jonagold, Pinova, Tuscan	1
		medium				Charlotte, Nela, Pilot, Prima	2
		large				Elstar, Holsteiner Cox, Schone van Boskoop, Suntan	3
36.		**QN VG**	**(f)**	**87**			
		Fruit: area of russet on cheeks					
		absent or small				Gala, Jonagold, Monidel, Obelisk, Pia, Pilot	1
		medium				Lurefresh, Schone van Boskoop, Suntan	2
		large				Canada gris, Egremont Russet, Zabergäurenette	3

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
37.	**(*)**	**QN VG**	**(f)**	**87**			
		Fruit: area of russet around eye basin					
		absent or small				Gala, Jonagold, Pinova, Prima	1
		medium				Elstar, Holsteiner Cox	2
		large				Egremont Russet, Fresco, Schone van Boskoop, Suntan	3
38.		**QN MG/VG**	**(+) (f)**	**87**			
		Fruit: number of lenticels					
		very few					1
		few				Coxcolumnar, Rewena	2
		medium				Elstar, Pia, Pinova, Redkan, Tenroy	3
		many				Dalili, Honeycrisp, Jonagored, Scifresh	4
		very many				Hidden Rose	5
39.	**(*)**	**QN MG/VG**	**(+) (f)**	**87**			
		Fruit: length of stalk					
		very short					1
		short				Holsteiner Cox, Minnewashta, Telamon, Trajan, Tuscan	2
		medium				Bay 3484, Lurefresh, Nicoter	3
		long				Elise, Pinova, Rafzubin, Tenroy	4
		very long				Rewena	5
40.	**(*)**	**QN MG/VG**	**(+) (f)**	**87**			
		Fruit: depth of stalk cavity					
		very shallow					1
		shallow				Pomfit, Pompink, Rafzubin, Suntan, Trajan	2
		medium				Dalili, Elstar, Fiesta, Topaz	3
		deep				Jonagold, MC 38, Rosy Glow	4
		very deep					5

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
41.		**QN VG**					
		Fruit: calyx eye					
		closed					1
		partially open					2
		fully open					3
42.	**(*)**	**QN MG/VG**	**(+) (f)**	**87**			
		Fruit: depth of eye basin					
		very shallow					1
		shallow				Braeburn, Lurefresh	2
		medium				Obelisk, Pinova, Scifresh, Topaz	3
		deep				Dalili, Elstar, Jonagold	4
		very deep				MC 38	5
43.	**(*)**	**QN MG/VG**	**(+) (f)**	**87**			
		Fruit: width of eye basin					
		very narrow					1
		narrow				SQ 159	2
		medium				Braeburn, Elstar, Minnewashta, Pia, Tenroy	3
		broad				Bruggers Festivale, Dalili, Dalinbel, Obelisk	4
		very broad				Solaris	5
44.	**(*)**	**QN MG/VG**	**(+) (f)**	**89**			
		Fruit: firmness of flesh					
		very soft				Transparent de Croncels	1
		soft				Bay 3484, Pia, Pingo, Piros, Tuscan	2
		medium				Obelisk, Red Fuji, Santana, Schone van Boskoop, Topaz	3
		firm				Braeburn, Pilot	4
		very firm					5

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
45.	**(*)**	**PQ**	**VG**		**(f)**	**89**			
		Fruit: color of flesh							
		white						Akane, Minnewashta, Pia, Spartan	1
		yellowish white						Elstar, Jonagold, Pinova, Rafzubin	2
		yellowish						Coxcolumnar, Pisaxa, Topaz, Zari	3
		greenish						Angold, Gloster, Granny Smith, Northpole, Telamon	4
		pinkish						Pomfit	5
		reddish						Bay 3484, Baya Marisa, Lureprec	6
46.		**QN**	**VG**	**(+)**		**89**			
		Fruit: extent of anthocyanin coloration around core							
		absent or weak						Elstar	1
		medium						Bay 3484	2
		strong						Luregust	3
47.	**(*)**	**QN**	**MG/VG**	**(+)**		**61**			
		Time of beginning of flowering							
		very early						Anna, Ein-Shemer	1
		very early to early						Egremont Russet, Nela	2
		early						Idared, Minnewashta, Prima	3
		early to medium						Dalili, James Grieve, Pomforyou	4
		medium						Elstar, Jonagold, Pinova, Rafzubin, Santana	5
		medium to late						Elise, Gala, Redkan	6
		late						Obelisk, Pia, Saturn, Suntan	7
		late to very late						Delorina	8
		very late						Spätblühender Taffetapfel	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
48.	**QN MG/VG**	**(+)**				
	Time for harvest					
	very early					1
	very early to early					2
	early					3
	early to medium					4
	medium					5
	medium to late					6
	late					7
	late to very late					8
	very late					9
49. **(*)**	**QN MG/VG**		**89**			
	Time of eating maturity					
	very early				Astramel, Vista Bella	1
	very early to early				Beauty of Bath, White Transparent	2
	early				Discovery, Jerseymac, Nela	3
	early to medium				Akane, Dalili, James Grieve, Pia, Summerred	4
	medium				Bay 3484, Elstar, Rubinola, Santana	5
	medium to late				Fiesta, Jonagold, Rafzubin, Topaz	6
	late				Ecolette, Golden Delicious, Renora, Rewena	7
	late to very late				Braeburn, Fuji, MC 38, Pilot, Suntan	8
	very late				Cripps Pink, Granny Smith	9

8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

Characteristics containing the following key in the Table of Characteristics should be examined as indicated below:

(a) Observations should be made on bare trees in winter.

(b) Observations on one-year-old shoots should be made on lateral dormant shoots in winter, on trees that have completed at least one growing season.

(c) Observations should be made on fully developed leaves from the middle third of vigorous vegetative current season shoot

(d) Observations should be made on second or subsequent flowers, at the start of anther dehiscence.

(e) Observations should be made 40 days after flowering.

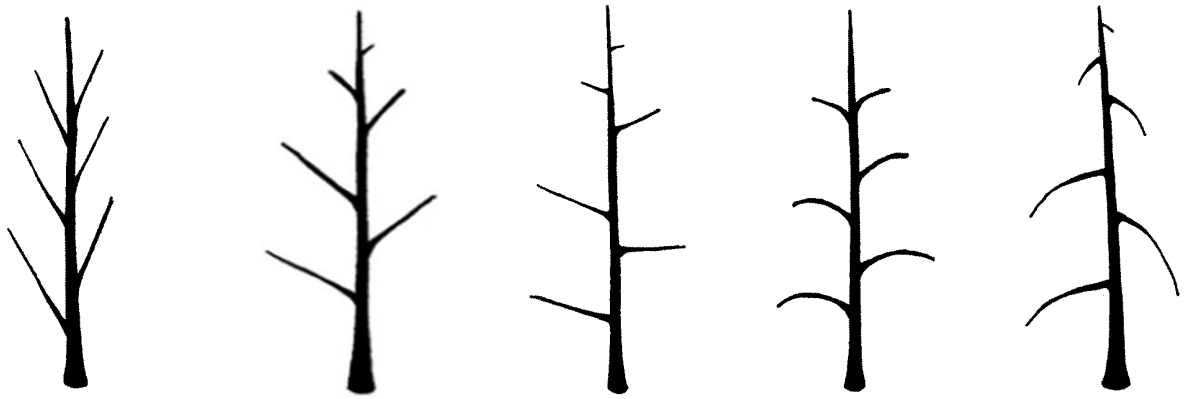
(f) Observations on the fruit should be made on fruits when they are eating ripe.

8.2 Explanations for individual characteristics

Ad. 1: Tree: vigor

The vigor of the tree should be considered as the overall abundance of vegetative growth.

Ad. 3: Only varieties with Tree type: ramified: Tree: habit



1 upright | 2 upright to spreading | 3 spreading | 4 drooping | 5 weeping

Should be assessed in dormant period, after at least one sufficient fruit production.

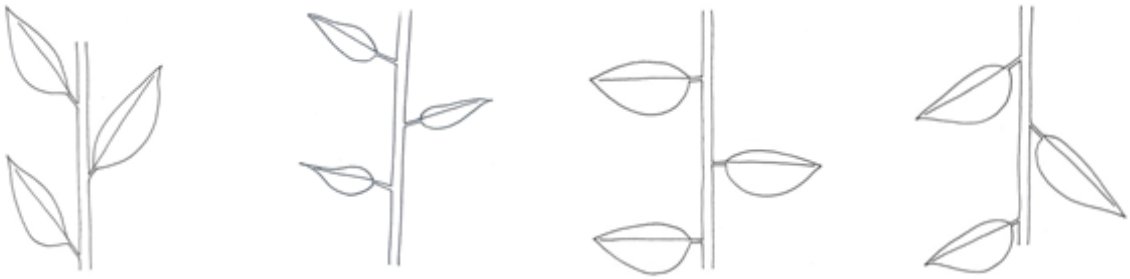
Ad. 4: One-year-old shoot: length of internode

The length of the internode should be observed in the middle third of the shoot. Measurements can be made using a vernier caliper gauge.

Ad. 5: One-year-old shoot: number of lenticels

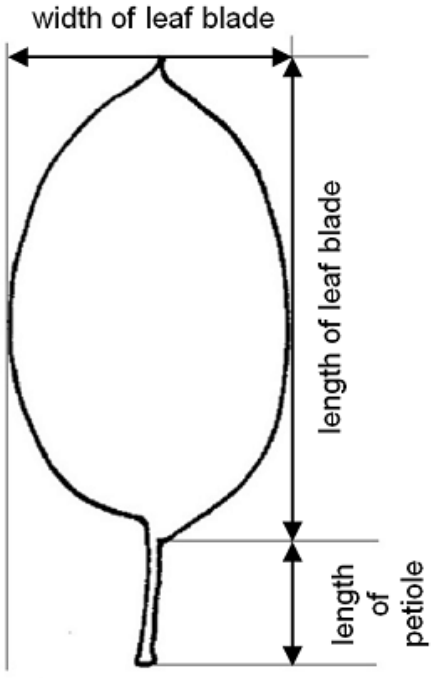
Should be assessed at midlength of shoot, by counting (in a defined area [e.g. a shoot length of 1 cm] or by visual assessment of the density of lenticels on the bark.

Ad. 6: Leaf blade: attitude in relation to shoot



1	2	3	4
upwards	upwards to outwards	outwards	downwards

Ad. 7: Leaf blade: length



Ad. 8: Leaf blade: width

See Ad. 7

Ad. 9: Leaf blade: ratio length/width

See Ad. 7

Ad. 12: Leaf blade: incisions of margin

1
crenate

2
crenate to serrate

3
serrate

Ad. 13: Leaf blade: shape in cross section

1
v-shaped

2
concave

3
flat with raised margins

4
flat

5
convex

Ad. 14: Petiole: length

See Ad. 7

Ad. 15: Leaf: ratio length of leaf blade / length of petiole

See Ad. 7

Ad. 17: Flower: diameter

To assess with petals pressed into horizontal position.

Ad. 18: Flower: position of stigmas relative to anthers

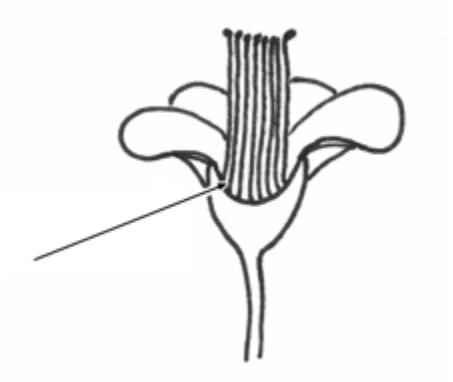
1
below

2
same level

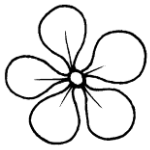
3
above

Ad. 19: Flower: intensity of anthocyanin coloration at base of filament

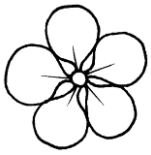
Should be observed just after petal drop.



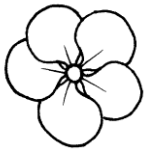
Ad. 20: Flower: arrangement of petals



1
free



2
intermediate



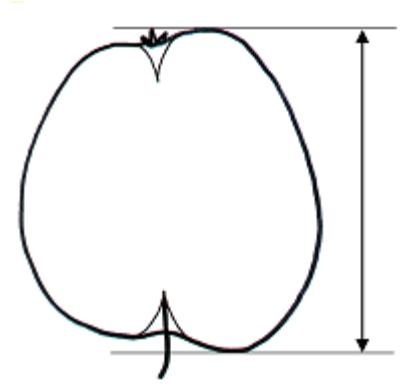
3
overlapping

Ad. 22: Fruit: size

Should be assessed visually, or by measuring the fruit weight.

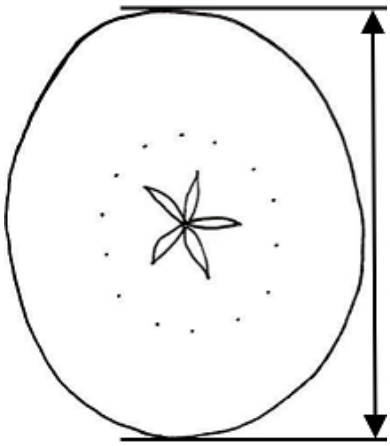
Ad. 23: Fruit: height

The maximum height should be observed.



Ad. 24: Fruit: diameter

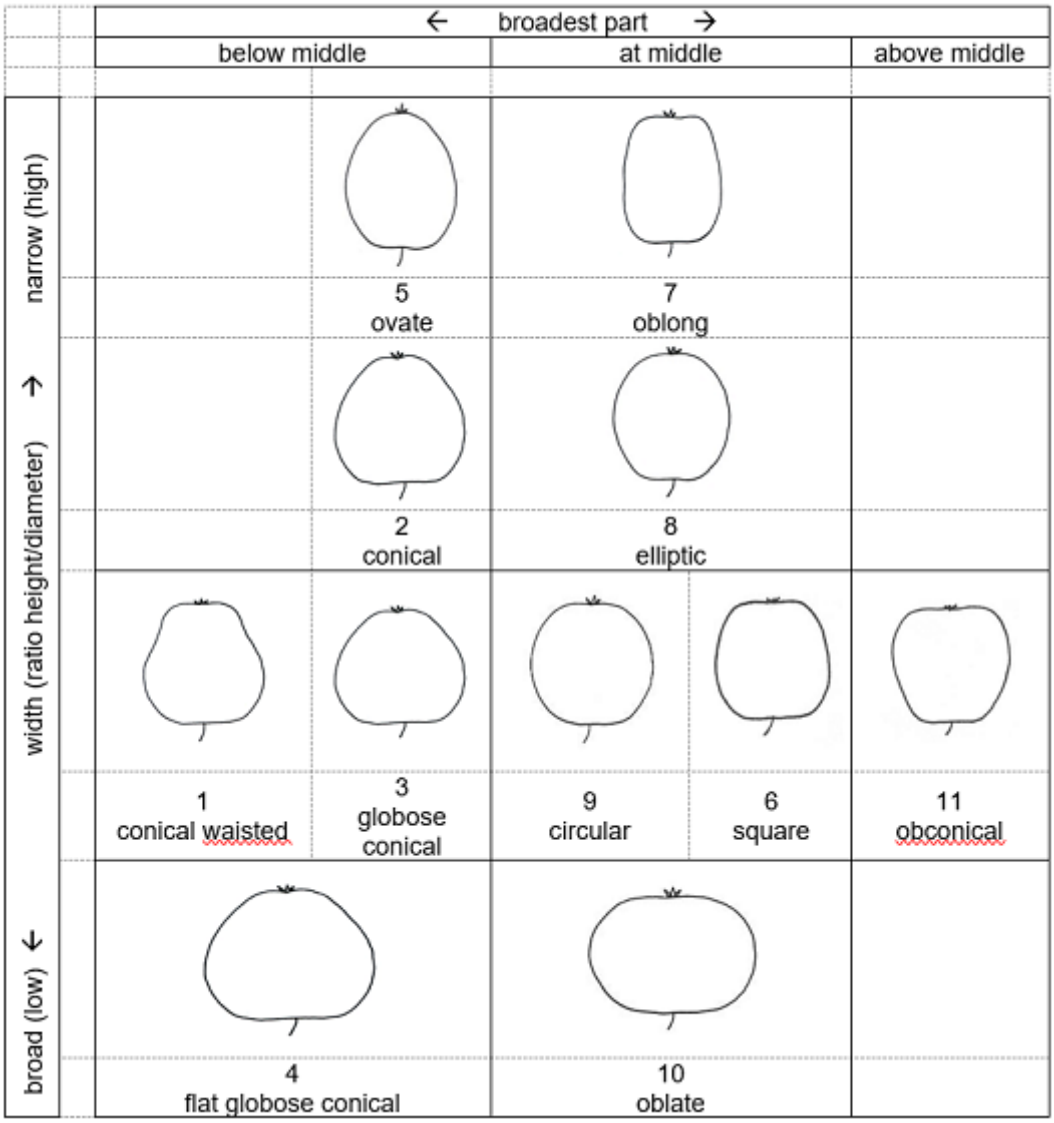
The maximum diameter should be observed.



Ad. 25: Fruit: ratio height/diameter

(propose to add information): See figures in Ad 26. A ratio, in the middle of the possible range, resulting in a value of 1,0 would then represent states 1, 3, 6, 9 or 11; values smaller than 1,0 would result in notes 4 or 10; and values larger than 1,0 would result in notes 2, 5, 7 or 8

Ad. 26: Fruit: shape



Ad. 30: Fruit: hue of over color

Should be observed after removing bloom.

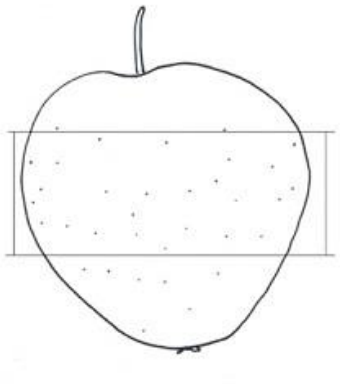
Ad. 31: Fruit: intensity of over color

(to be updated)

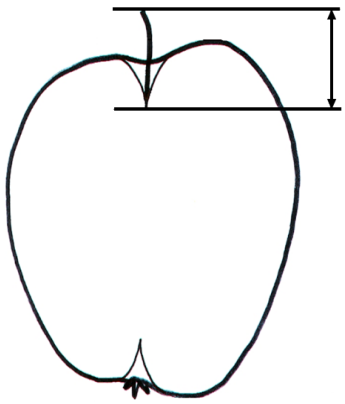
	← Ad. 45: Fruit: intensity of over color →								
	very light	very light to light	light	light to medium	medium	medium to dark	dark	dark to very dark	very dark
orange red			Egremont Russet, Scigold, Sirprize		Cox's Orange Pippin, Reine des Reinettes				
pink red			Lady Williams		Cripps Pink		Delorgue		
red			Winter Banana		Gala		Akane, Galaxy, Red Elstar, Regal Prince		
purple red							Red Jona-prince, Spartan		
brown red			Sturmer Pippin		Fiesta		Lord Burgley, Joburn		

Ad. 38: Fruit: number of lenticels

Should be assessed at midlength of fruit, by counting (in a defined area [e.g. a window of 1 cm²] or by visual assessment of the density of lenticels on the skin.

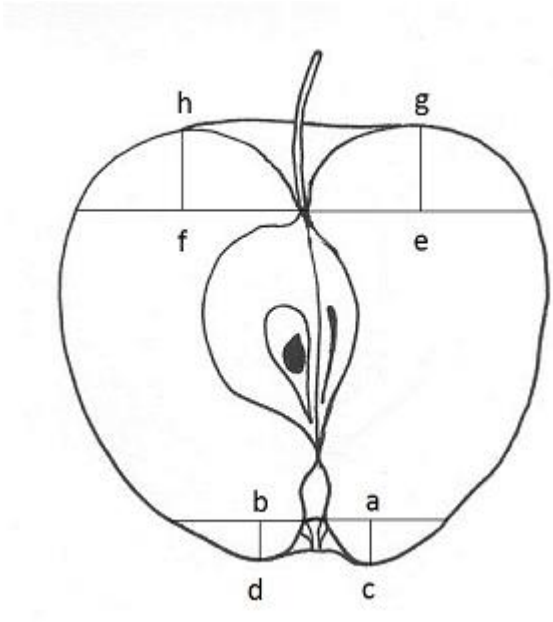


Ad. 39: Fruit: length of stalk



Ad. 40: Fruit: depth of stalk cavity

Fruits should be cut through the central axis as accurately as possible. Stalk cavity and eye basin depth and width should be measured from the sectioned fruits. The following diagram indicates the position of lines scored, using a knife or scalpel, on the fruit prior to measuring these characteristics.
• The lines a-b and e-f must be at right angles to the axis of the fruit. (A plastic protractor can be used to ensure accuracy.)
• The line a-b is marked at the base of the sepals.
• The line e-f is marked at the insertion of the stalk.
• The lines a-c and b-d indicate the eye basin depth. They are drawn at right angles to the line a-b to the point where the basin curve levels out.
• The lines e-g and f-h indicate the stalk cavity depth. They are drawn at right angles to the line e-f to the point where the stalk cavity curve levels out.
• In the case of asymmetric or irregular sections, the larger side should be considered.



f-h = depth of stalk cavity (characteristic 55)
e-f = width of stalk cavity (characteristic 56)
a-c = depth of eye basin (characteristic 57)
a-b = width of eye basin (characteristic 58)

Ad. 42: Fruit: depth of eye basin

See Ad. 51

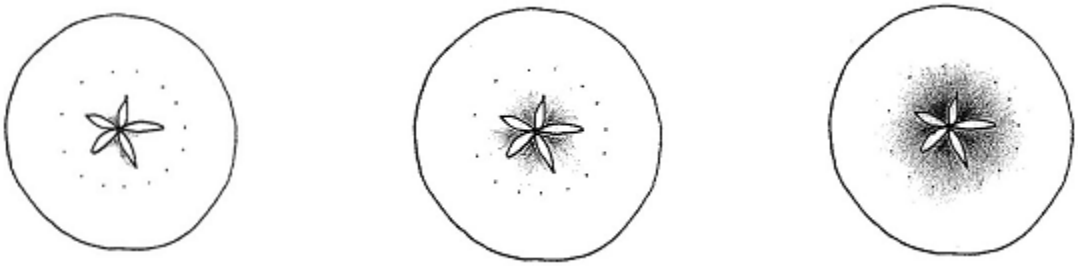
Ad. 43: Fruit: width of eye basin

See Ad. 51

Ad. 44: Fruit: firmness of flesh

Firmness of flesh should be assessed at time of ripeness for eating. It can be measured using a penetrometer.

Ad. 46: Fruit: extent of anthocyanin coloration around core



1
absent or weak

2
medium

3
strong

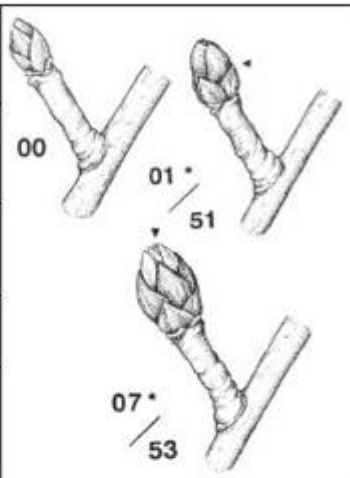
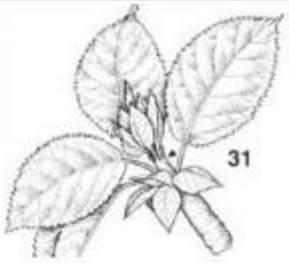
Ad. 47: Time of beginning of flowering

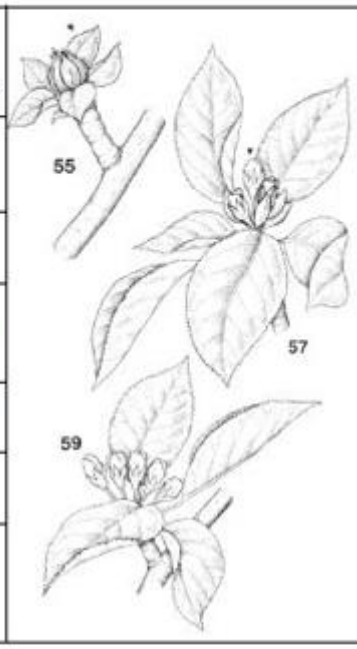
Time of beginning of flowering is when 10% of the flowers are fully open.

Ad. 48: Time for harvest

Should be assessed as time when fruits are picking ripe /when fruits can most easily be picked from the trees.

8.3 **BBCH-Scale for the description of the phenological growth stages of pome fruit**

Stage	Explanation	
Principal growth stage 0: Bud development		
00	Dormancy: leaf buds and the thicker inflorescence buds closed and covered by dark brown scales	
01	Beginning of bud swelling (leaf buds); buds visibly swollen, bud scales elongated, with light colored patches	
03	End of leaf bud swelling: bud scales light colored with some parts densely covered by hairs	
07	Beginning of bud break: first green leaf tips just visible	
09	Green leaf tips about 5 mm above bud scales	
Principal growth stage 1: Leaf development		
10	Green leaf tips 10 mm above the bud scales; first leaves separating (mouse-ear stage)	
11	First leaves unfolded (others still unfolding)	
15	More leaves unfolded, not yet at full size	
19	First leaves fully expanded	
Principal growth stage 2: (not applicable)		
Principal growth stage 3: Shoot development[4] [4] From terminal buds		
31	Beginning of shoot growth: axes of developing shoots visible	
32	Shoots about 20 % of final length	
39	Shoots about 90 % of final length	

Principal growth stage 4: Development of stolons and young plants (not applicable)		
Principal growth stage 5: Inflorescence emergence		
51	Inflorescence buds swelling: Inflorescence buds swelling: bud scales elongated, with light buds closed, light brown scales colored patches visible	
52	End of bud swelling: light colored bud scales visible with parts densely covered by hairs	
53	Bud burst: green leaf tips enclosing flowers visible	
54	Mouse-ear stage: green leaf tips 10 mm above bud scales; first leaves separating Flower buds visible (still closed)	
56	Green bud stage: single flowers separating (still closed)	
57	Red bud stage: flower petals elongating; sepals slightly open; petals just visible	
59	Most flowers with petals forming a hollow ball	
Principal growth stage 6: Flowering		
60	First flowers open	
61	Beginning of flowering: about 10 % of flowers open	
65	Full flowering: at least 50 % of flowers open, first petals falling	
67	Flowers fading: majority of Flowers fading: majority of petals fallen	
69	End of flowering: all petals fallen	

Principal growth stage 7: Development of fruit		
71	Fruit size up to 10 mm; fruit fall after flowering	 75
72	Fruit size up to 20 mm	
73	Second fruit fall	
74	Fruit diameter up to 40 mm; fruit erect (T-stage: underside of fruit and stalk forming a T)	
75	Fruit about half final size	
77	Fruit about 70 % of final size	
Principal growth stage 8: Maturity of fruit and seed		
81	Beginning of ripening: lightening of cultivar-specific fruit color	(no drawing)
85	Advanced ripening: increase in intensity of cultivar-specific color	
87	Fruit ripe for picking	
89	Fruit ripe for consumption: fruit have typical taste and firmness	
Principal growth stage 9: Senescence, beginning of dormancy		
91	Shoot growth completed; terminal bud developed; foliage still fully green	(no drawing)
92	Leaves begin to discolor	
93	Beginning of leaf fall	
97	All leaves fallen	
99	Harvested product	

Example varieties	**Synonyms**
Api Noir	Schwarzer Noir
Auralia	Tumanga
Canada gris	Kanadarenette; Reinette de Caen
Cox's Orange Pippin	Cox Orangenrenette
Gloster	Gloster 69
Golden Delicious	Gelber Köstlicher
Golden Noble	Gelber Edelapfel
Ingrid Marie	Hoed Orange
Rambour d'Hiver	Rheinischer Winterrambur
Teser	TSR 29
Transparente de Croncels	Yellow Transparent
Šampion	Shampion
Schone van Boskoop	Belle de Boskoop; Schöner aus Boskoop
White Transparent	Papirovka, Transparente Jaune, Weißer

9. Literature

Aeppli, A., Gremminger, U., Rapillard, Ch., Röthlisberger, K., 1983: “100 Obstsorten”, Verlag Landwirtschaftliche Lehrmittelzentrale Zollikofen, CH

Aomori-ken, 1977: “The report on the characterization and classification of apple varieties,” Aomori-ken, JP

Baldini, E., Sansavini, S., 1967: “Monografia delle principale cultivar di melo,” Istituto di coltivazioni arboree dell’Università di Bologna, IT

Bergamini, A., Faedi, W. 1983 and 1985: “Monografia di cultivar di melo”, Volumes I + II, Ministero Agricoltura e Foreste, Roma, IT

Brozik, S., Regius J., 1957: “Termeszett gyumolcsfajtaink Almastermesuek. Alma Fruit varieties Apple,” Mezogazdasagi Kiado, Budapest, HU

Bultitude, J., 1983: “A Guide to the Identification of International Varieties,” Macmillan Reference Books, Macmillan Press, London, GB

Dvorak, A., et al., 1956: “Jablka (Apple),” Academia Praha, CZ

Fischer, M., 1995: “Farbatlas Obstsorten,” Eugen Ulmer Verlag, Stuttgart, DE

Fleckinger, J., 1948: "Les stades végétatives des arbres frutiers, en rapport avec les traitements." Pomology Français 1948, supplements 81-93, FR

Khanizadeh, S. and Cousineau, J., 1998: “Our Apples – Les Pommiers de chez nous”, Agriculture and Agri-Food Canada, St.-Jean-sur Richelieu, Quebec, CA

Kessler, H., 1948: “Apfelsorten der Schweiz”, Verlag Verbandsdruckerei AG Bern, CH

Krümmel, H., Groh W., Friedrich, G., 1956: “Deutsche Obstsorten”, Deutscher Bauernverlag, Berlin, DE

Meier, U., 1997: "Growth stages of mono- and dicotyledonous plants." Blackwell, Berlin, Vienna.

Morgan, J., Richards, A., 2002: “The Book of Apples,” Ebury Press, London, GB

Nilsson, Anton, 1987: “Vara applesorter” Allmanna Forlaget AB, Stockholm SE

Petzold, H., 1990: “Apfelsorten”, Verlag Neumann, Leipzig, Radebeul, DE

Silbereisen, R., 1980: “Apfelsorten” 2nd. ed., Verlag Eugen Ulmer, Stuttgart, DE

Smith, M.W.G., 1971: “National Apple Register of the United Kingdom,” Ministry of Agriculture, Fisheries & Food, London, GB

Toth, G. M., 2001: “Gyumolcseszet” Primom, Nyiregyhaza, HU

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

	Application date: (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

1.1 Botanical name	*Malus domestica* Borkh.
1.2 Common name	Apple

2. Applicant

Name	
Address	
Telephone No.	
Fax No.	
E-mail address	
Breeder (if different from applicant)	

3. Proposed denomination and breeder's reference

Proposed denomination (if available)	
Breeder's reference	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

4.2 Method of propagating the variety

4.2.1 Other [ ]

(Please provide details)

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (2)	**Tree: type**		
	columnar	MacExcel, Wijcik	1 [ ]
	ramified	Elstar, Golden Delicious	2 [ ]
5.2 (3)	**Only varieties with Tree type: ramified: Tree: habit**		
	upright	Alkmene, Fresco, Solaris	1 [ ]
	upright to spreading	Akane, Arkcharm, Harmensz, Katrina, Reka	2 [ ]
	spreading	Pinova, Redkan, Topaz	3 [ ]
	drooping	Idared, James Grieve, Pivita	4 [ ]
	weeping	Gerlinde, Nield's Drooper	5 [ ]
5.3 (26)	**Fruit: shape**		
	conical waisted	Gloster, Redkan	1 [ ]
	conical	Civni, Elstar, Nicoter, Pinova, Rafzubin	2 [ ]
	globose conical	Bay 3484, Braeburn, Scifresh	3 [ ]
	flat globose conical	Melrose	4 [ ]
	ovate	Cripps Pink, Delcorf	5 [ ]
	square	Bonita	6 [ ]
	oblong	Renora, Čadel	7 [ ]
	elliptic	Fuji BC, Minnewashta	8 [ ]
	circular	Dalinbel, Rubinola, Topaz	9 [ ]
	oblate	Bramley's Seedling, Lipno	10 [ ]
	obconical	Empire	11 [ ]
5.4 (30)	**Fruit: hue of over color**		
	orange red	Goldstar, Rea Gold, Solaris	1 [ ]
	pink red	Cripps Pink, Delorgue	2 [ ]
	red	Pinova, Prima, Red Elstar, Tenroy	3 [ ]
	purple red	Bay 3484, Luresweet, MC 38, Spartan	4 [ ]
	brown red	Braeburn, Fiesta, Fresco, Fuji BC, Suntan	5 [ ]

	Characteristics	Example Varieties	Note
5.5 (32)	**Fruit: relative area of over color**		
	absent or very small	Granny Smith, Tuscan	1 [ ]
	very small to small	Golden Delicious	2 [ ]
	small	Auralia, Cox's Orange Pippin, Goldstar, Solaris	3 [ ]
	small to medium	Charlotte, Schone van Boskoop	4 [ ]
	medium	Dalili, Elstar, Minnewashta, Rea Gold	5 [ ]
	medium to large	Heco, Pia, Rafzubin	6 [ ]
	large	Fiesta, Santana, Suntan, Tenroy	7 [ ]
	large to very large	Mars, Rosy Glow, SQ 159	8 [ ]
	very large	Bay 3484, MC 38, Red Jonaprince, Redkan	9 [ ]
5.6 (33)	**Fruit: pattern of over color**		
	only solid flush	Bay 3484, Red Jonaprince, Telamon	1 [ ]
	solid flush with weakly defined stripes	Bruggers Festivale, Charlotte, Cripps Pink, Pingo	2 [ ]
	solid flush with strongly defined stripes	Dalili, Pia, Pompink	3 [ ]
	weakly defined flush with strongly defined stripes	James Grieve Esselborn, Rekarda	4 [ ]
	only stripes (no flush)	Dülmener Rosenapfel	5 [ ]
	flushed and mottled	Dalinbel, Scifresh	6 [ ]
	flushed, striped and mottled	Elstar, Pinova, Rafzubin, Topaz	7 [ ]
	marbled	Karneval	8 [ ]
5.7 (47)	**Time of beginning of flowering**		
	very early	Anna, Ein-Shemer	1 [ ]
	very early to early	Egremont Russet, Nela	2 [ ]
	early	Idared, Minnewashta, Prima	3 [ ]
	early to medium	Dalili, James Grieve, Pomforyou	4 [ ]
	medium	Elstar, Jonagold, Pinova, Rafzubin, Santana	5 [ ]
	medium to late	Elise, Gala, Redkan	6 [ ]
	late	Obelisk, Pia, Saturn, Suntan	7 [ ]
	late to very late	Delorina	8 [ ]
	very late	Spätblühender Taffetapfel	9 [ ]

	Characteristics	Example Varieties	Note
5.8 (48)	**Time for harvest**		
	very early		1 [ ]
	very early to early		2 [ ]
	early		3 [ ]
	early to medium		4 [ ]
	medium		5 [ ]
	medium to late		6 [ ]
	late		7 [ ]
	late to very late		8 [ ]
	very late		9 [ ]
5.9 (49)	**Time of eating maturity**		
	very early	Astramel, Vista Bella	1 [ ]
	very early to early	Beauty of Bath, White Transparent	2 [ ]
	early	Discovery, Jerseymac, Nela	3 [ ]
	early to medium	Akane, Dalili, James Grieve, Pia, Summerred	4 [ ]
	medium	Bay 3484, Elstar, Rubinola, Santana	5 [ ]
	medium to late	Fiesta, Jonagold, Rafzubin, Topaz	6 [ ]
	late	Ecolette, Golden Delicious, Renora, Rewena	7 [ ]
	late to very late	Braeburn, Fuji, MC 38, Pilot, Suntan	8 [ ]
	very late	Cripps Pink, Granny Smith	9 [ ]

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your	Characteristic(s) in which your candidate variety differs	Describe the expression of the characteristic(s) for the	Describe the expression of the characteristic(s) for **your**
Example			

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

[#]7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

(a)	Microorganisms (e.g. virus, bacteria, phytoplasma)	Yes [ ]	No [ ]
(b)	Chemical treatment (e.g. growth retardant, pesticide)	Yes [ ]	No [ ]
(c)	Tissue culture	Yes [ ]	No [ ]
(d)	Other factors	Yes [ ]	No [ ]

Please provide details for where you have indicated “yes”.

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]